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Two new species of the terrestrial isopods from the foot of
Mt. Nishime, Okinawa, southern Japan*

Noboru Nunomura

Toyama Science Museum

1-8-31, Nishinakano-machi, Toyama, 939-8084, JAPAN

沖縄島西銘岳山麓から発見された陸産等脚目の2新種

布村 昇

富山市科学文化センター

〒939-8084富山市西中野町1-8-31

沖縄県国頭村西銘岳の麓のシダ植物, オオタニワタリに貯まった土から採集された陸産等脚目のうちトウヨウワラジムシ科ならびにコシビロダンゴムシ科の各1種を, 新種 *Agnara ryukyuensis* (リュウキュウハヤシワラジムシ: 新称) ならびに *Venezillo brevipalma* (ヒロテコシビロダンゴムシ: 新称) として記載した。前者は五島列島から知られている *Agnara gotoensis* ともっとも類似するが, (1) 雄第1腹肢外肢が長いこと, (2) 第1, 7胸脚上の剛毛数が少ないこと, (3) 体色が薄いこと, (4) 大顎可動葉片と臼歯状突起間に羽状剛毛があること, (5) 第1触角先端の剛毛数が少ないことなどによって区別される。

後者は那覇市から知られている *Venezillo shuriensis* (Nunomura) と類似するが(1)第7胸脚の内側に突出した部分を持つこと, (2) 第7胸脚の腕節が広いこと (3) 全体により黒っぽい色をしていること (4) 雄の第1腹肢内肢がより複雑な構造を持っていることなどによって区別される。

キーワード: ワラジムシ, 陸産等脚目, 新種, 沖縄,

Key words: new species, Okinawa, isopoda. *Agnara*, *Venezillo*

During an ecological survey on the animal community of a big fern, *Nettopteris antiqua* Masamune, at the foot of Mt. Nishime, northern part of Okinawa Island, Okinawa Prefecture, Mr. Shigetaka Karasawa, graduate student of Ryukyu University, collected many specimens and handed to me for identification. As the results of the identification of mine, I found a new species of the genus *Agnara* and a new species of the genus *Venezillo*,

Before going further, I wish to express my sincere gratitude to Mr. Shigetaka Karasawa, graduate student of Ryukyu University for his kindness in giving me the chance to such interesting materials.

Family Trachelipidae

Agnara ryukyuensis, n.sp.

(Figs. 1 and 2)

Material examined; 2♂♂ (1♂ holotype 3.4mm in body length and 1♂ paratype, 3.3mm in body length) and 3♀♀ (1♀ allotype, 4.1mm in body length and 2♀♀ paratypes, 3.2-3.3mm in body length) at the foot of Mt. Nishime-dake, Kunigami-son. Okinawa Pref., Nov. 3, 2001, coll. Shigetaka Kawanawa. Type series is deposited as

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follows: holotype (TOYA Cr- 12922), allotype (TOYA Cr- 12923), a paratype (TOYA Cr- 12924) at the Toyama Sience Museum a paratypes (OMNH-Ar-5869) at the Osaka Museum of Natural History and a paratype (OPM Cr-106) at the Okinawa Prefectural Museum.

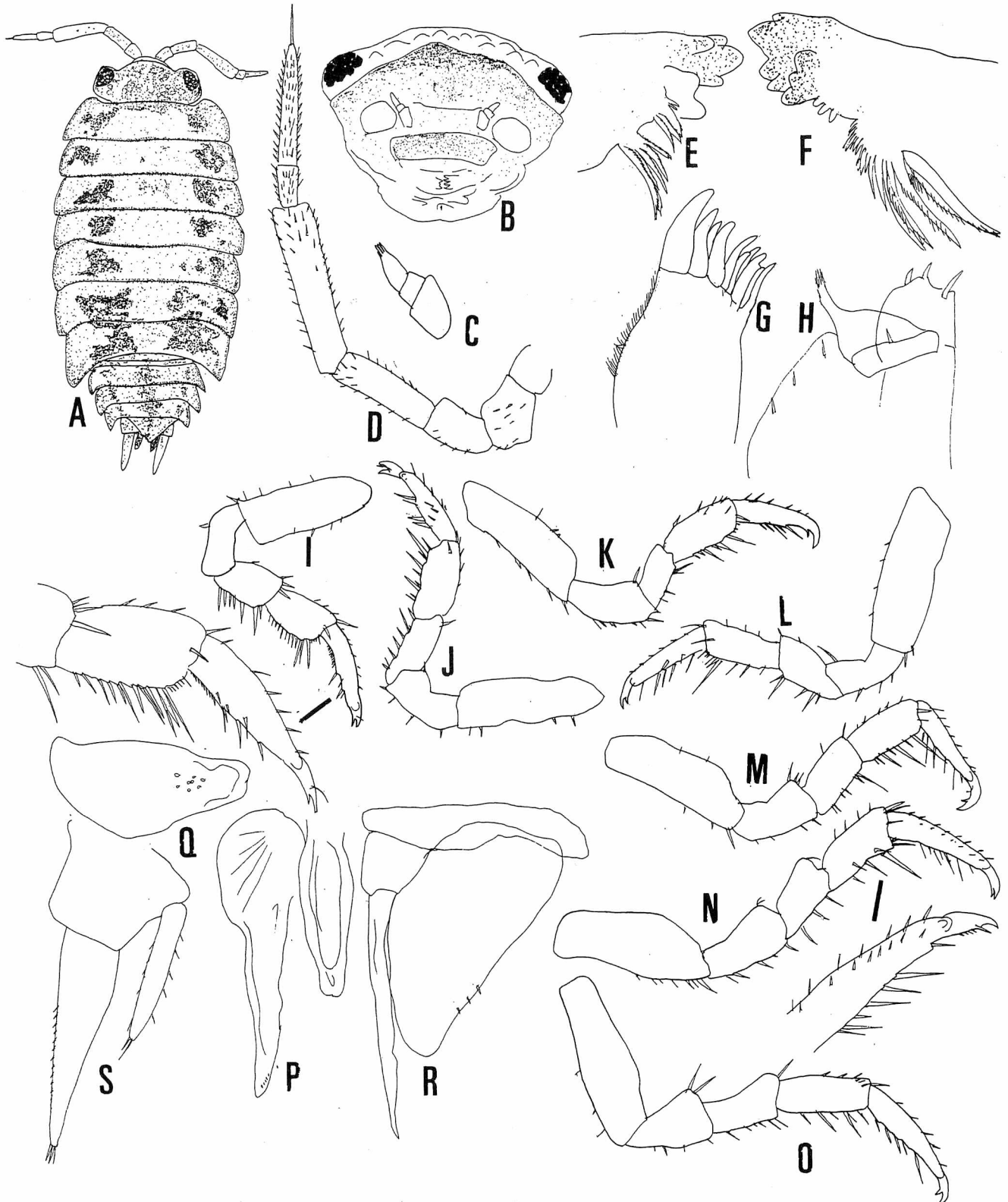


Fig. 1 *Agnara ryukyuensis*, n. sp.

A : Dorsal view. B : Frontal view of cephalon. C : Antennule. D : Antenna. E : Right mandible. F : Left mandible. G : Outer lobe of maxillula. H : Maxilliped. I - O : Pereopods 1-7. P : Penes and endopod of male pleopod. Q : Exopod of the same. R : Pleopod 2. S : Uropod (All:Holotype male).

Description of male: Body 2.0 times as long as wide. Color dull yellow, with a pair of darker irregular patterns on dorsal surface. Cephalon with lateral projections and a small frontal process weakly 2-headed in frontal view (Fig.1B). Eyes relatively large in size, each eye composed of 10-15 ommatidia. All the noduli lateralis are near from the lateral border. Pleotelson triangular, 0.55 times as long as wide.

Antennule (Fig.1C): first segment rectangular; second segment short; terminal segment slender, with 3-4 aesthetascs at the tip. Antenna (Fig.1D) reaches the anterior half of the second pereonal somite. Relative length of 2 flagellar segments is 4 : 11. Right mandible (Fig.1E): pars incisiva 4-toothed; lacinia mobilis 2-toothed; 3 hairy bristles; processus molaris represented by a tuft of setae. Left mandible (Fig.1F): pars incisiva 4-toothed; lacinia mobilis 3-toothed; 3 hairy bristles; processus molaris represented by a long tuft of setae. Maxillula (Fig.1G); inner lobe with 2 plumose setae; outer lobe with 10 simple teeth at the tip. Maxilliped (Fig.1H): endite rectangular, with 3 spurs on distal margin; palp relatively short, with a tuft of setae at the tip.

Pereopod 1 (Fig.1I) is shorter than the other succeeding 6 pairs of pereopods: basis rectangular, 2.9 times as long as wide, with 4-5 setae on both margins; ischium 3/5 as long as basis; merus 2/3 as long as wide, with 7 long setae on inner margin and 3 setae on outer distal area; carpus 1.3 times longer than merus, with 10-12 setae on inner margin, distal 3 setae area obviously longer than the others, and a seta at outer distal angle; propodus 1.4 times as long as carpus, with 12 -14 short setae on basal half of inner margin, 4 longer setae on distal half of inner margin.

Pereopod 2 (Fig.1J): basis 5 times as long as wide; ischium 55% as long as basis, with 3-4 setae on inner margin and a seta at outer distal angle; merus slightly shorter than ischium, with 7-8 setae on inner margin and a seta at outer distal angle; carpus a little longer than merus, with 10 setae including a long one on inner margin, with 6-7 setae on outer margin; propodus a little shorter than carpus, with 4 setae on inner margin and 4-5 setae on outer margin.

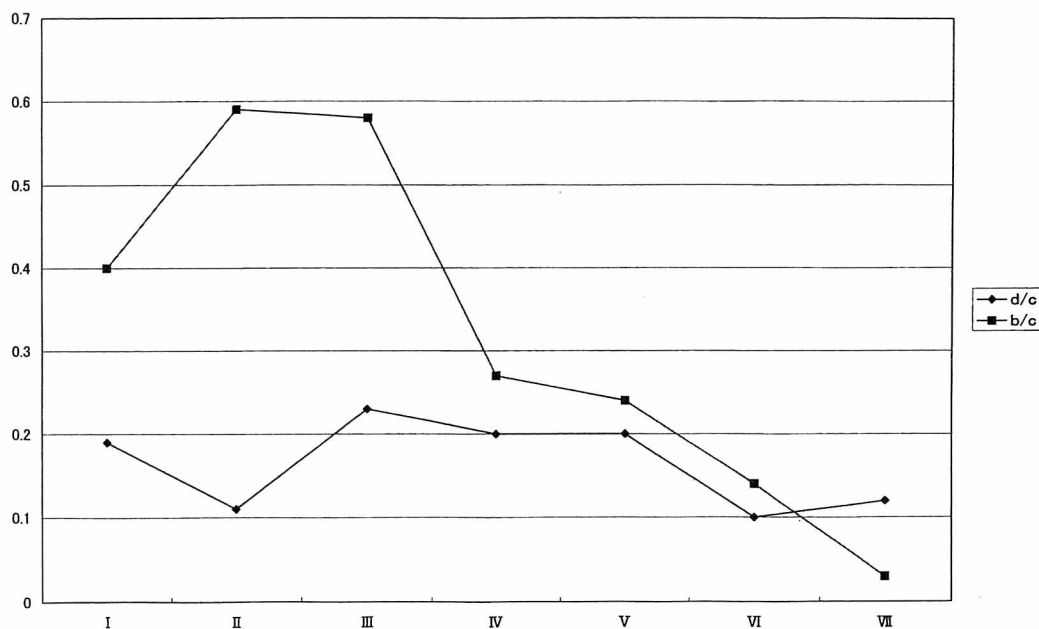


Fig. 2. Position of noduli lateralis of *Agnara ryukyuensis*, n. sp.

Pereopod 3 (Fig.1K): basis 2.9 times as long as wide, with 5-6 setae on inner margin and 2-4 setae on outer margin; ischium 0.6 times as long as basis, with 6-8 setae on inner margin and a seta at outer distal angle; merus 0.6 times as long as ischium, with 4-5 setae on inner margin; carpus as long as ischium, with 9-10 setae on inner margin and 6-8 setae on outer margin; propodus as long as carpus, with 5 setae on inner margin and 6-7 setae on outer margin.

Pereopod 4 (Fig.1L): basis 3.0 times as long as wide, with 2 setae on inner margin and 3-4 setae on outer margin; ischium half the length of basis, with 4-5 setae on inner margin and a seta on outer distal angle; merus a little shorter than ischium, with 5-6 setae on inner margin and 2-3 on outer margin; carpus a little longer than merus, with 9-10 setae on inner margin 2 setae on distal margin and 3-4 setae on outer margin; propodus 1.2 times longer than carpus, with 5 setae on inner margin and 6-7 setae on outer margin.

Pereopod 5 (Fig.1M): basis 2.8 times as long as wide, with 3 setae on inner margin and 2-3 setae on outer margin; ischium less than half the length of basis, with 4-5 setae on inner margin and 3 setae on outer distal angle; merus 5/7 as long as ischium, with 6 setae on inner margin and 2-3 on outer margin; carpus a little longer than merus with 7-8 setae on inner margin, 2 setae on distal margin and 5-6 setae on outer margin; propodus 1.2 times longer than carpus, with 6 setae on inner margin and 6-8 setae on outer margin.

Pereopod 6 (Fig.1N): basis 2.6 times as long as wide, with 7-8 setae on inner margin; ischium 3/5 as long as wide, with 5-6 setae on inner margin and 2-3 setae on sternal margin; merus 0.7 times as long as wide, 3 setae on inner margin; carpus 1.3 times longer than merus, with 6 setae on inner margin, 6-7 setae on outer margin and 4-6 setae on outer margin; propodus 1.5 times longer than carpus, with 7 setae on inner margin and 8 setae on outer margin.

Pereopod 7 (Fig.1O): basis 2.8 times as long as wide, with 3-4 setae on inner margin; ischium half the length of basis, with 4 setae on inner margin and 2 setae on outer distal angle; merus a little shorter than ischium, with 6 setae on inner margin and a seta at outer distal angle; carpus 1.3 times longer than merus, with 6-8 setae on inner margin; propodus 1.1 times longer than carpus with 5-6 setae on inner margin and 5 setae on outer margin.

Penes (Fig.1P) rectangular and rather stout, 3.4 times as long as wide, distal end rounded. Pleopod 1 (Fig.1P and Q): endopod straight, apical area bearing 5-10 spinules on inner margin; exopod short, 0.45 times as long as wide. Pleopod 2 (Fig.1R): endopod long, exopod triangular. Uropod (Fig.1S): basis almost square; endopod 4 times as long as wide, with 2-3 relatively short setae at the tip; exopod, 1.4 times as long as endopod, with a tuft of 3 short setae at the tip.

Female: Roughly similar to male except for copulatory apparatus.

Etymology: The species name refers to Ryukyu, name of district of south western Japan, where the present specimens were collected.

Remarks: The present new species is most closely allied to *Agnara gotoensis* reported from Goto Island, Nagasaki Prefecture, but the former is separated from the latter in the following features: (1) longer exopod of male pleopod 1, (2) less numerous setae on pereopods 1 and 7, (3) paler color of dorsal surfaces, (4) presence of hairy bristles between lacinia mobilis and processus molaris and (5) less numerous aesthetascs on antennule.

The present new species is also separated from *A. panuosus*, in the following features: (1) absence of concavity on exopod of male pleopod 1 (2) less numerous setae on pereopod, (3) absence of trifold setae on pereopods and (4) less numerous spurs on maxilliped.

Family Armadillidae
Venezillo brevipalma n.sp.

(Figs. 3 and 4)

Material examined; 18♂♂ (1♂ holotype, 7.3mm in body length and 17♂♂ paratypes, 5.0-8.0mm in body length) and 15♀♀ (1♀ allotype, 7.9mm in body length and 14♀♀ paratypes 5.0-8.1mm in body length), at the foot of Mt. Nishime-dake, Kunigami-son. Okinawa Pref., Nov. 3, 2001, coll. Shigetaka Kawarewa. Type series is deposited as follows : holotype (TOYA Cr-12925), allotype (TOYA Cr-12926), 6 paratype (TOYA Cr-12927-12932) at the Toyama Science Museum, 9 paratypes (NSMT Cr-15159) at the National Science Museum, Tokyo, 9 paratypes (OMNH-Ar 5870~5878) at the Osaka Museum of Natural History and 9 paratypes (OPM Cr-107~115) at the Okinawa Prefectural Museum.

Description of male-Body 1.9 times as long as wide. Color blackish, with relatively large paler pattern. Schisma (Fig. 3J) on pereonal somite 1 big; tooth-like structure on pereonal somite 2 wide but shallow. Pleotelson (Fig. 3M) hour-grass-shaped and rather long, as long as wide.

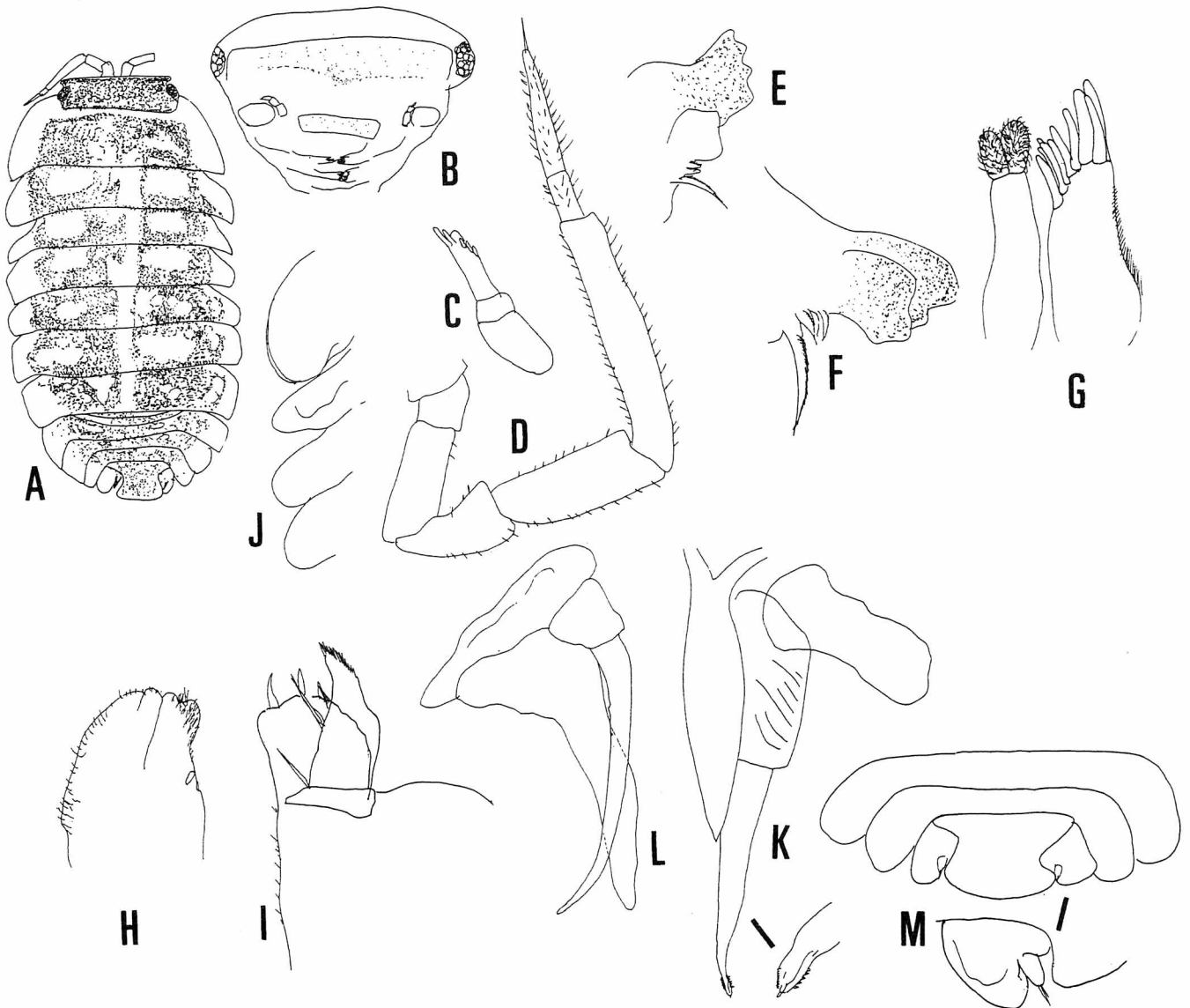


Fig. 3 *Venezillo brevipalma* n.sp.

A : Dorsal view. B : Frontal view of cephalon. C : Antennule. D : Antenna. E : Right antenna. F : Left mandible. G : Maxillula. H : Maxilla. I : Maxilliped. J : Ventral view of pereonites 1-4. K : Penes and male pleopod 1. L : Male pleopod 2. (All : Holotype male).

Antennule (Fig.3C) : terminal segment with 5 aesthetascs at the tip. Antenna (Fig. 3D) short, reaching the anterior area of pereonal somite 1 ; peduncle brown, relative length of 5 peduncular segments is 4 : 8 : 10 : 13 : 24. Flagellum pale brown, and $\frac{3}{5}$ as long as 5th peduncular segment. Mutual length of 2 flagellar segments is 1:3.

Right mandible (Fig.3E) : pars incisiva weakly 4-headed; lacinia mobilis single-toothed; 2 plumose setae; processus molaris represented by a single plumose seta. Left mandible (Fig. 3F) ; pars incisiva weakly 2-headed; lacinia mobilis single-toothed ; 2 plumose setae ; processus molaris represented by a single plumose seta. Maxillula (Fig. 3G); endopod with 3 plumose setae at the tip ; exopod with 10 simple setae on distal margin. Maxilla as Fig. 3H. Maxilliped (Fig. 3I) ; endite rectangular with 3 spurs; palp slender.

Pereopod 1 (Fig. 4A) : basis 3.8 times as long as wide; ischium less than half the length of basis, with 4-6 setae on inner margin and a seta on sternal margin ; merus $\frac{3}{5}$ as long as ischium, with 17-20 setae on inner margin and a seta at outer distal margin; carpus 1.4 times as long as merus, with 8-10 setae on inner margin; propodus 1.2 times as long as carpus, with 5 setae on distal half of inner margin, many fine setae on basal half of inner margin, 9-13 short setae on outer margin and many fine setae on the part near outer margin.

Pereopod 2 (Fig. 4B) : basis 4.1 times as long as wide, with many setae sparsely; ischium $\frac{2}{5}$ as long as basis, with 20-25 setae along inner margin and a seta at sternal margin ; merus a little shorter than ischium, with 10 setae on basal half of inner margin, 4-5 setae on inner distal area and 2 setae on outer margin; carpus 1.4 times longer than merus, with 8 long setae on inner margin and 9-12 setae on outer margin ; propodus as long as carpus, with 7-8 setae on inner margin and 14-15 setae on outer margin.

Pereopod 3 (Fig. 4C) : basis 3.9 times as long as wide, with 6-7 setae on inner margin and setae sparsely and 7-10 setae on outer margin ; ischium $\frac{2}{3}$ as long as basis, with 19-25 setae on inner margin and 2-3 setae on outer margin; merus 0.7 times as long as ischium, with 20-23 setae on inner margin and a seta at outer distal angle ; carpus

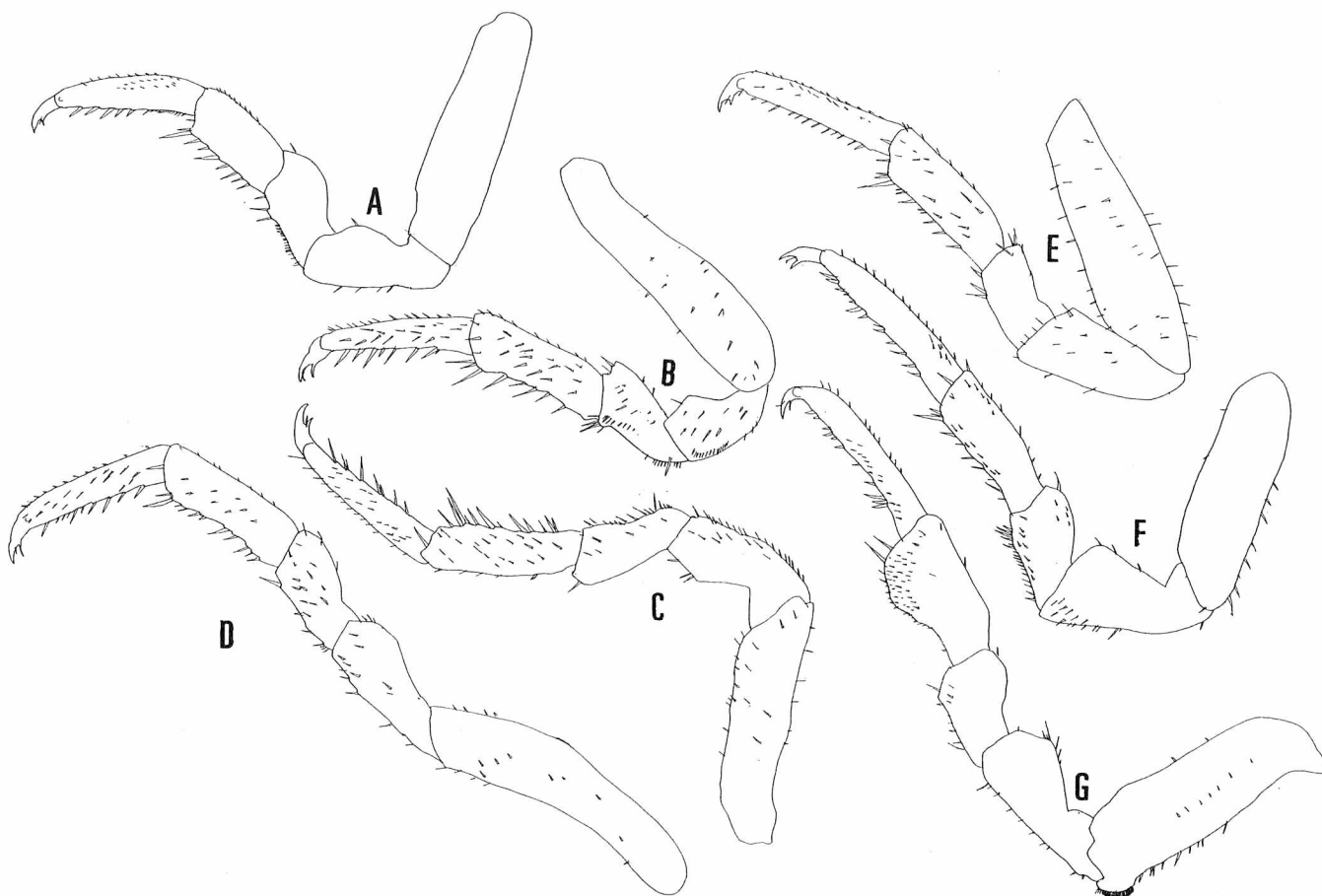


Fig. 4. *Venezillo brevipalma* n.sp.
A - G : Pereopods 1-7(All: Holotype male).

as long as ischium, with 12-14 setae on inner margin and 5-10 setae on outer margin; propodus as long as carpus, with 8 setae on inner margin and 14-16 setae on outer margin.

Pereopod 4 (Fig. 4D) : basis 4.4 times as long as wide, with 5-12 setae on inner margin and 4-10 setae on outer margin ; ischium half the length and 4-5 setae on inner margin and 3-4 setae on outer distal area; merus 0.7 times as long as ischium, with 4-8 setae on inner margin and 3-4 setae on outer margin ; carpus 1.6 times longer than merus, with 11-13 setae on inner margin and 8-11 setae on outer margin and 8-10 setae on outer margin ; propodus a little longer than carpus, with 10 setae on inner margin and 12 setae on outer margin.

Pereopod 5 (Fig. 4E) : basis 4.0 times as long as wide, with 7-9 setae on inner margin and 8-10 setae on outer margin; ischium 55% as long as basis, with 3-4 setae on inner margin and a seta at outer distal angle; merus 3/5 as long as ischium, with 3 setae on inner distal area and 3-5 setae on outer distal area; carpus twice longer than merus, with 12-13 setae on inner margin and 5-8 setae on outer margin; propodus as long as carpus, with 12-14 setae on inner margin and 15-16 setae on outer margin.

Pereopod 6 (Fig. 4F) : basis 3.3 times as long as wide, with 8-9 setae on inner margin; ischium 0.8 times as long as wide, with many setae on inner distal area; merus 0.6 times as long as ischium, with more than 20 setae on inner margin and a seta at outer distal area; carpus 1.5 times as long as merus, with more than 10 setae on inner margin and more than a dozen setae on outer margin; propodus 1.25 times longer than carpus, with 13-14 setae on inner margin and 14-16 shorter setae on outer margin.

Pereopod 7 (Fig. 4G) : basis 3.0 times as long as wide, with a protruded area bearing many short setae on inner distal area, 9-10 setae on inner margin; ischium 2/5 as long as basis, with 10 setae on inner margin and 7-8 setae on outer margin; merus 1/2 as long as ischium, with 7-8 setae on inner margin and a seta on outer margin; carpus 1.8 as long as merus, with a inner area swollen, with 2 longer and many short setae on inner side; propodus 1.2 times as long as carpus, with 11-12 setae on inner margin and about a dozen shorter setae on outer margin.

Penes (Fig. 3K) fusiform. Pleopod 1 (Fig. 3K) ; endopod straight, apical part only slightly bent outerwards, bearing 5 small denticles on outer side and more than a dozen denticles on inner side of apical area.

Pleopod 2 (Fig. 3L) endopod long ; exopod elongated triangular. Uropod as in Fig. 3M.

Female : Roughly similar to male except for copulatory apparatus.

Etymology: Etymology: *brevus* = broad in Latin, *palma* = palm of hand in Latin.

Remarks: The present new species are most closely allied to *V. shuriensis* (Nunomura) recorded from Naha, southern area of Okinawa Island. But the former is separated from the latter in the following features : (1) presence of protruded area of inner distal area of pereopod 7, (2) wider carpus of pereopod 7, (3) darker color patterns and (4) more complicated apical area of endopod of male pleopod 1.

The present new species is separated from *V. kunigamiensis* recorded from the northern part of Okinawa Island but is separated from *kunigamiensis* by the following features : (1) presence of protruded area of inner distal area of pereopod 7, (2) wider carpus of pereopod 7, (3) paler color patterns and (4) more complicated apical area of endopod of male pleopod 1.

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